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THE EARLY STAGES OF *ADALUMA URUMELIA* TINDALE AND *CANDALIDES GEMINUS* EDWARDS AND KERR (LEPIDOPTERA: LYCAENIDAE)

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Abstract

The early stages of *Adaluma urumelia* and *Candalides geminus* are briefly described and the generic relationships of the former discussed.

Adaluma urumelia Tindale

(Figs 1, 2, 4, 5)

Egg. Pale green; slightly flatter than hemispherical, with a depressed micropylar area; surface a complex pattern of pits and ridges with truncate projections where ridges intersect. Diameter 0.6 mm, height 0.3 mm. Two eggs preserved in the Australian National Insect Collection, tube No. 2879.

Final instar larva (Figs 1, 2). Head pale brownish green; thoracic and abdominal segments pale green, dorsal line darker green, three subdorsal lines cream, upper two angled laterally towards rear of each segment, lateral line cream; spiracles cream. Prothoracic and anal plates pale green, flattened and densely covered with short secondary setae. Dorsal and lateral surfaces of thorax and abdomen covered with short, colourless secondary setae; primary setae colourless, longer. Dorsal gland on abdominal segment 7 well developed, resembling a transverse line. Abdominal segment 8 with slightly raised projections bearing eversible organs. Length 14 mm. Two final instar larvae preserved in the Australian National Insect Collection, tube No. 2879.

Pupa (Figs 4, 5). Head, thorax and abdomen pale green or brown mottled with dark brown; spiracles pale brown. Head and abdomen flattened, with prominent lateral flanges; middorsal line raised, two short dorsal projections on thorax; surface of cuticle roughened and covered with minute raised dots. Attached to silken pad by anal hooks and central girdle. Length 11 mm, width 6 mm. Three pupae preserved in the Australian National Insect Collection, tube Nos. 2822 and 2881.

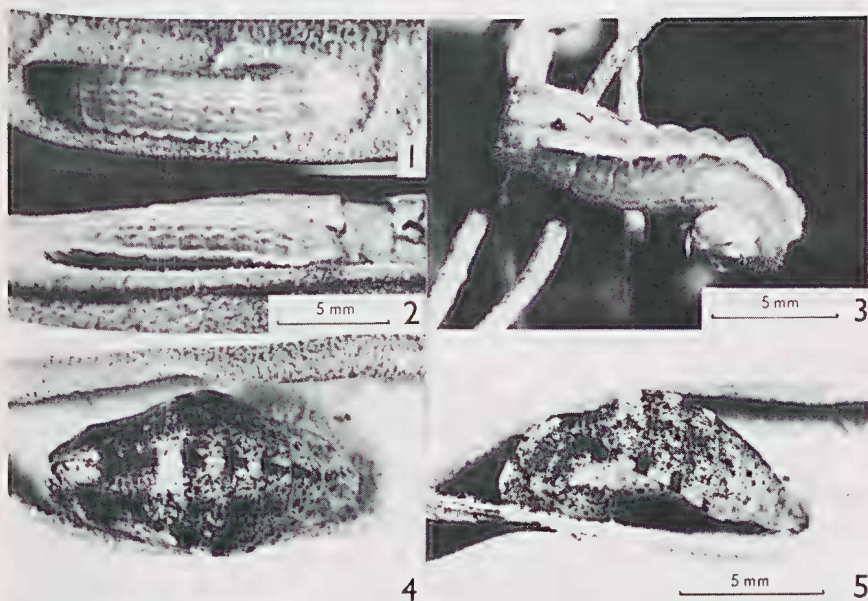
Food plant. *Boronia lanceolata* F. Muell. (Rutaceae).

COMMENTS

The early stages were collected in broken sandstone country at Nourlangie Creek, 8 km E of Mt Cahill, Northern Territory (coordinates 12°52'S, 132°47'E) in November 1972 and May 1973. Adults were collected at many sites within the catchments of the South and East Alligator Rivers in October, November, March, May and June and also near McArthur River Homestead, N.T. in October. Adults were probably present throughout the wet season (October to May).

Eggs were laid singly on the undersides of mature leaves, or on the petioles, of the food plant. Larvae rested and fed on the undersides of the leaves. Small black ants of the genus *Monomorium* attended the larvae but bushes invaded by green tree-ants [*Oecophylla smaragdina* (Fabricius)] lacked larvae. In May very pale empty pupal cases were plentiful, and a few green pupae were found on the undersides of mature leaves of the food plant. These were not found in the previous November which suggests that the pupal duration of these green pupae during the wet season was quite short. Larvae collected in late May and pupating in plastic bags in semi-darkness produced brown, mottled pupae. The pupal durations of two of these pupae were 220 and 310 days in the laboratory. It is possible that some, or all, larvae that become adults during the same wet season produce green pupae and pupate beneath living leaves on the food plant, while at the end of the wet season larvae pupate in sheltered situations off the food plant and adults do not emerge until the following wet season, from October onwards.

The larvae are more elongate than those of *Candalides xanthospilos* (Hübner) and similar in shape to those of *Nesolycaena albosericea* (Miskin) although less brightly coloured. The pupa is also very similar in shape to that of *N. albosericea* and both are slightly less flattened dorsoventrally than that of *C. xanthospilos*. The larvae of both *Adaluma* and *Nesolycaena* also feed on *Boronia*. The similarities in larval and pupal shape and in larval food plant support the close relationship of these two genera suggested by Sands (1971) and the form of the pupae clearly shows that they belong to the tribe Candalidini. However, it does not seem necessary to synonymise *Adaluma* and *Nesolycaena* if the division of *Candalides sens. lat.* into five genera by Tite (1963) is accepted. If, however, the genus *Candalides* is maintained in its broad sense the early stages and the larval food plant provide evidence that *Adaluma* should be synonymised with *Nesolycaena*. Nevertheless, as *Nesolycaena* was not studied by Tite (1963), a thorough evaluation of adult characters should be undertaken before reaching a decision.



Figs 1-5. (1, 2) dorsolateral and lateral views of final instar larva of *Adaluma urumelia* Tindale; (3) final instar larva of *Candalides geminus* Edwards and Kerr; (4, 5) dorsal and lateral views of pupa of *Adaluma urumelia* Tindale.

Candalides geminus Edwards and Kerr
(Fig. 3)

Egg. Pale green when laid, soon becoming paler; dull white shortly before emergence. Flatter than hemispherical, with micropylar area depressed; surface with pattern of wide pits and ridges, slightly raised where ridges intersect. Diameter 0.7 mm, height 0.4 mm. One egg preserved in the Australian National Insect Collection, tube No. 2937.

First instar larva. Uniformly pale reddish brown. Head hidden by prothorax; thorax and abdomen with prominent primary setae.

Final instar larva (Fig. 3). Head green; thorax and abdomen green; dorsal line dark green; raised dorsal red spots on abdominal segments 1 and 6 (sometimes absent on 1); pale yellow subdorsal line on thoracic segments and abdominal segments 7 to 10, prominent on abdominal segments 1 to 6, white with yellow towards rear of each segment; subdorsal line bordered laterally on abdominal segments 1 to 6 by deep purple line (red in preserved larvae); lateral line pale yellow or absent; spiracles yellow. Prothoracic and anal plates green, flattened, covered with short secondary setae. Thorax and abdomen with primary setae short, brown on dorsal surface, colourless laterally; secondary setae colourless. Dorsal gland on abdominal segment 7 well developed, oval in shape. Areas

bearing eversible organs on abdominal segment 8 not raised. Length 15 mm. One larva preserved in the Australian National Insect Collection, tube No. 2938.

Pupa. Pale brownish yellow with scattered brown dots coalescing on dorsal line and wing margins to form dark markings; spiracles pale brown. Head and abdomen flattened and with prominent lateral flanges; middorsal line on head and abdomen raised; two short dorsal projections on thorax; surface of cuticle roughened and covered with minute raised dots. Attached to silken pad by anal hooks and central girdle. Length 13 mm, width 6 mm. One pupa preserved in the Australian National Insect Collection, tube No. 2938.

Food plant. *Cassytha paniculata* R.Br. (Cassythaceae).

COMMENTS

Larvae were reared from eggs collected 40 km ENE of Coonabarabran, N.S.W. (coordinates 31°07'S, 149°40'E) in October 1977.

Eggs were laid singly on the flower buds of the food plant. Ants were not present but may well attend the larvae. The larvae probably feed openly on the food plant during the day and pupate in sheltered situations nearby as do closely related species. They change colour to brown or reddish brown prior to pupation. Several eggs were parasitised by a wasp of the family Scelionidae. In the laboratory, at about 22°C, eggs hatched after approximately 10 days, the larval stage lasted 22 days and the pupal stage 13 days. The species probably has a rapid succession of generations during the spring, summer and autumn in the southern parts of its range.

The larva is very similar in shape to that of *Candalides hyacinthinus* (Semper) and *C. erinus* (Fabricius) but is more brightly coloured than is usual in these species. The pupa is very similar in shape to that of *C. erinus*.

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